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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/573,383

Applicant(s)

LINDAHL ET AL.

Examiner

EMILY PHAM

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/04/2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 42-93 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 42-93 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3/24/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppel et al. (USP 6,906,434) in view of Iyoda et al. (USP 6,680,602).

Koeppel et al. (**FIG 4, FIG 4B**) disclose a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks, comprising: at least one AC transmission cable (**20**); at least one transformer (**22a, 22b**) with variable voltage transformation arranged in shunt connection at each end of the at least one AC transmission cable (**20**); a voltage control member (**60**) operatively connected to the at least one said transformer (**22a, 22b**) to minimize losses due to reactive power transport (**col. 3, lines 46-49**).

Koeppel et al. do not disclose a voltage control member operative to control said transformers in a coordinated manner to regulate an operating voltage of said AC transmission cable; and at least one tap-changer operatively connected to the voltage control member and to one of said transformers to vary the voltage transformation of the transformer according to said operating voltage.

Iyoda et al. (**FIG 1, FIG 4**) teach a voltage control member (**1, 10**) operative to control said transformers (**Transformer 17**) in a coordinated manner to regulate an

operating voltage of said AC transmission cable; at least one tap-changer **(tap changer 17a)** operatively connected to the voltage control member **(1, 10)** and to one of said transformers **(Transformer 17)** to vary the voltage transformation of the transformer **(Transformer 17)** according to said operating voltage. **(The reactive power compensator and tap changer of Iyoda can be duplicated to be operatively connected to the transformers connected to two ends of the transmission line.)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Koepppe et al. with the reactor power compensator taught by Iyoda et al. for the purpose of regulating the voltage transformation of the transformer according to operating voltage **(Iyoda et al., col. 5, lines 16-43)**.

3. Claims 42-46, 48, 50, 58, 66-74, 77-80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koepppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565).

Regarding claims 42-46, 50, 58, 66-68: Koepppe et al. **(FIG 4, FIG 4B)** disclose a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks, comprising: at least one AC transmission cable **(20)**; at least one transformer **(22a, 22b)** with variable voltage transformation arranged in shunt connection at each end of the at least one AC transmission cable **(20)**; a voltage control member **(60)** operatively connected to the at

least one said transformer **(22a, 22b)** to minimize losses due to reactive power transport **(col. 3, lines 46-49)**.

Koeppel et al. do not disclose a voltage control member operative to control said transformers in a coordinated manner to regulate an operating voltage of said AC transmission cable; and at least one tap-changer operatively connected to the voltage control member and to one of said transformers to vary the voltage transformation of the transformer according to said operating voltage.

Wilkins et al. **(FIG 4)** teach a voltage control member **(line drop compensator 445)** operative to control said transformers **(402)** in a coordinated manner to regulate an operating voltage of said AC transmission cable; at least one tap-changer **(402)** operatively connected to the voltage control member **(445)** and to one of said transformers **(402)** to vary the voltage transformation of the transformer **(402)** according to said operating voltage. **(The line drop compensator and tap changer of Wilkins et al. can be duplicated to be operatively connected to the transformers connected to two ends of the transmission line.)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Koeppel et al. with the real and reactive power control for wind turbine generator systems taught by Wilkins et al. for the purpose of regulating the voltage transformation of the transformer according to operating voltage **(Wilkins et al., col. 5, lines 16-19)**.

Regarding claims 69-74, 77-80: Koeppel et al. in view of Wilkins et al. **(see rejection of claims 42-46, 50, 58, 66-68 above)** disclose the apparatus at its normal operation performing the steps of method disclosed in claims 69-74 and 77-80.

4. Claims 83-87, and 90-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppel et al. (USP 6,906,434) in view of Vithayathil et al. (USP 5,032,738).

Regarding claims 83-87, 90, 91: Koeppel et al. **(FIG 4, FIG 4B)** disclose a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks, comprising: at least one AC transmission cable **(20)**; at least one transformer **(22a, 22b)** with variable voltage transformation arranged in shunt connection at each end of the at least one AC transmission cable **(20)**; a voltage control member **(60)** operatively connected to the at least one said transformer **(22a, 22b)** to minimize losses due to reactive power transport **(col. 3, lines 46-49)**.

However Koeppel et al. do not disclose a voltage control member operative to control said transformers in a coordinated manner to regulate an operating voltage of said AC transmission cable; and at least one tap-changer operatively connected to the voltage control member and to one of said transformers to vary the voltage transformation of the transformer according to said operating voltage.

Vithayathil et al. **(FIG 1, FIG 1(a))** teach a voltage control member **(10)** operative to control said transformers **(12)** in a coordinated manner to regulate an operating

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voltage of said AC transmission cable; at least one tap-changer **(402)** operatively connected to the voltage control member **(445)** and to one of said transformers **(402)** to vary the voltage transformation of the transformer **(402)** according to said operating voltage. **(The device for rapid adjustment of network impedance and tap changer of Vithayathil et al. can be duplicated to be operatively connected to the transformers connected to two ends of the transmission line.)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Koeppel et al. with the device for rapid adjustment of network impedance taught by Vithayathil et al. for the purpose of regulating the voltage transformation of the transformer according to operating voltage by adjusting the transfer impedance **(Vithayathil et al., Abstract)**.

Regarding claims 92-93: Koeppel et al. in view of Vithayathil et al. **(see rejection of claims 83-87, 90, 91 above)** disclose the apparatus at its normal operation performing the steps of method disclosed in claims 92-93.

5. Dependent claim 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppel et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565) and further in view of Ghosh et al. (USP 6,925,385).

Koeppel et al. in view of Wilkins et al. disclose claimed invention except for a graphical user interface for controlling the AC transmission, the interface comprising: at least one object oriented application for presenting data, parameter values and control

actions for operating parameters of the AC transmission cable system and/or a control system for at least one transformer. Ghosh et al. teach a graphical user interface for controlling the AC transmission (**GUI to control and manage the wind power system**) the interface comprising: at least one object oriented application for presenting data, parameter values and control actions for operating parameters of the AC transmission cable system and/or a control system for at least one transformer (**FIG 2 – FIG 10; col. 11, lines 20-30**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Koeppe et al. in view of Wilkins et al. with the GUI system taught by Ghosh et al. for the purpose of control and manage the AC power transmission system through data and parameters communication.

6. Dependent claims 47, 75, and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Hubert et al. (USP 6,577,108).

Koeppe et al. in view of Wilkins et al. disclose claimed invention except for the control member is arranged with control instructions for operation of said AC transmission cable under thermal overload conditions during limited periods of time. Hubert et al. teach the control member is arranged with control instructions for operation of said AC transmission cable under thermal overload conditions during limited periods of time (**FIG 4, FIG 5; col. 5, lines 29-45**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the

AC power transmission disclosed by Koeppel et al. in view of Wilkins et al. with the voltage regulation circuit taught by Hubert et al. to monitor the temperature of the AC transmission cable.

7. Dependent claims 49 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppel et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Palmer (USP 4,081,741).

Koeppel et al. in view of Wilkins et al. disclose claimed invention except for a tap-changer /one or more tap changer by-pass connectors. Palmer (USP 4,081,741) teaches a tap-changer /one or more tap changer by-pass connectors (**FIG 4, col. 3, lines 10-31**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koeppel et al. in view of Wilkins et al. with the tap changer by-pass connectors taught by Palmer to increase the effectiveness in controlling the reactance of the AC transmission line.

8. Dependent claims 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppel et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Larsen et al. (USP 5,166,579).

Koeppel et al. in view of Wilkins et al. disclose claimed invention except for mechanical tap-changer/phase-shifting tap changer. Larsen et al. teach mechanical tap-changer/phase-shifting tap changer (**Abstract**). It would have been obvious to one

having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koepppe et al. in view of Wilkins et al. with the mechanical tap-changer/phase-shifting tap changer taught by Larsen et al. to increase the effectiveness in controlling the reactance of the AC transmission line.

9. Dependent claims 53 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koepppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Andrei (USP 6,011,389).

Koepppe et al. in view of Wilkins et al. disclose claimed invention except for an autotransformer. Andrei teaches an autotransformer (**Abstract; col. 2, line 50 – col. 3, line 13**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koepppe et al. in view of Wilkins et al. with the autotransformer taught by Andrei to increase the effectiveness in controlling the reactance of the AC transmission line.

10. Dependent claims 55 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koepppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Sasse et al. (US Pub 2004/0012472).

Koepppe et al. in view of Wilkins et al. disclose claimed invention except that transformer is arranged to limit short-circuit currents. Sasse et al. teaches transformer

is arranged to limit short-circuit currents (**par [0033]**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koepppe et al. in view of Wilkins et al. with the arrangement taught by Sasse et al. to limit short-circuit currents of the AC transmission line.

11. Dependent claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koepppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Retotar (USP 4,591,963).

Koepppe et al. in view of Wilkins et al. disclose claimed invention except for a high frequency filter. Retotar teaches a high frequency filter (**FIG 1, 102; col. 2, lines 20-25**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koepppe et al. in view of Wilkins et al. with the a high frequency filter taught by Retotar to eliminate the harmonic currents of AC transmission line.

12. Dependent claims 59 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koepppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Buckett et al. (USP 4,075,679).

Koepppe et al. in view of Wilkins et al. disclose claimed invention except for one or more breakers arranged for rapid disconnect and reconnect. Buckett et al. teach breakers arranged for rapid disconnect and reconnect (**FIG 4, 17**). It would have been

obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koepppe et al. in view of Wilkins et al. with the breakers taught by Buckett et al. to increase the effectiveness in controlling the reactance of the AC transmission line.

13. Dependent claims 64, 65, and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koepppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Watson et al. ("Surge Potentials on Underground Cable Sheath and Joint Insulation"; IEEE Transactions on Power Apparatus and Systems; June 1963; Volume 82; Issue 66; pages 239-249).

Koepppe et al. in view of Wilkins et al. disclose claimed invention except for a cable system shield comprising transposings and sheath sectionalizing insulators reducing shield induced currents. Watson et al. teach a cable system shield comprising transposings and sheath sectionalizing insulators (**col. 1, page 239**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the cable of the AC power transmission system disclosed by Koepppe et al. in view of Wilkins et al. with the transposings and sheath sectionalizing insulators taught by Watson et al. to protect the line from overvoltage and reduce shield induced currents.

14. Dependent claims 61-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koepppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565).

Koeppel et al. in view of Wilkins et al. disclose the claimed invention except that one AC transmission cable comprise an oil and paper insulated cable/XLPE insulated cable/ voltage protection devices. However oil and paper insulated cable/XLPE insulated cable/ voltage protection devices are well known in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use oil and paper insulated cable because it is secured from moisture and dielectric loss; XLPE insulated cable because this cable with a temperature sensing optic fiber placed longitudinally along the cable could be placed in the critical circuit such as duct or overhead transmission line having unknown thermal conditions; voltage protection devices because they protect the AC transmission system from over voltage condition.

15. Dependent claim 88 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppel et al. (USP 6,906,434) in view of Vithayathil et al. (USP 5,032,738), and further in view of Hubert et al. (USP 6,577,108). Koeppel et al. in view of Vithayathil et al. disclose claimed invention except for the control member is arranged with control instructions for operation of said AC transmission cable under thermal overload conditions during limited periods of time. Hubert et al. teach the control member is arranged with control instructions for operation of said AC transmission cable under thermal overload conditions during limited periods of time (**FIG 4, FIG 5; col. 5, lines 29-45**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by

Koeppel et al. in view of Vithayathil et al. with the voltage regulation circuit taught by Hubert et al. to monitor the temperature of the AC transmission cable.

16. Dependent claim 89 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppel et al. (USP 6,906,434) in view of Vithayathil et al. (USP 5,032,738), and further in view of Watson et al. ("Surge Potentials on Underground Cable Sheath and Joint Insulation"; IEEE Transactions on Power Apparatus and Systems; June 1963; Volume 82; Issue 66; pages 239-249). Koeppel et al. in view of Vithayathil et al. disclose claimed invention except for a cable system shield comprising transposings and sheath sectionalizing insulators reducing shield induced currents. Watson et al. teach a cable system shield comprising transposings and sheath sectionalizing insulators (**col. 1, page 239**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the cable of the AC power transmission system disclosed by Koeppel et al. in view of Vithayathil et al. with the transposings and sheath sectionalizing insulators taught by Watson et al. to protect the line from overvoltage and reduce shield induced currents.

Response to Arguments

17. Applicant's arguments with respect to claims 42, 62, 83, and 92 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Bleibtreu et al. (USP 3,934,174) disclose surge voltage protection for transfer switches for load-tap changers.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EMILY PHAM whose telephone number is (571)270-3046. The examiner can normally be reached on Mon-Thu (7:00AM - 6:00PM).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm Ullah can be reached on (571) 272 - 2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jessica Han/
Primary Examiner, Art Unit 2838
December 2008

/E. P./
